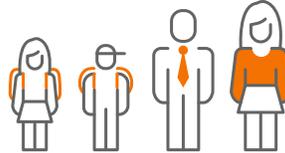


EAST SIDE UNION HIGH SCHOOL DISTRICT

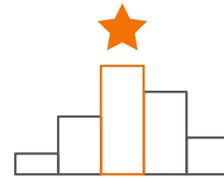
Closing the homework gap with RUCKUS



19 high schools



22,255 students, 945 teachers



Ranks #102 out of California's
1,165 public school districts



Customer

East Side Union High School District
(ESUHSD)

Location

San José, CA

Key challenges faced:

- Extending school Wi-Fi® to underserved neighborhoods for educational equity and bridging the homework gap
- Maintaining Wi-Fi performance and avoiding interference during network expansion

The East Side Union High School District (ESUHSD) is the seventh-largest high school district in the state and the largest in Northern California. It is also home to a 95% minority population—at least a third of which lacked internet access at home. To keep up with their studies, many students used to crowd

into the school's library on every other weekend to use the free Wi-Fi to work on research papers or catch up on homework. But this needed to change.

"East Side Union High School District faced serious issues as we transitioned to a digital curriculum," stated Randy Phelps, ESUHSD's chief technology officer. "Providing a reliable, powerful solution for families is critical to achieving our mission."

For students who had no access to broadband from home, ESUHSD knew they needed to find an alternate way to help students connect—or risk having them fall behind their peers. This digital divide between the students who have

home internet and those who don't is known as the "homework gap."

To close this homework gap, the city of San José and ESUHSD asked voters to approve a \$2.7 million school bond to fund an extension of their school Wi-Fi network to the surrounding neighborhoods as well as laptops. Once the voters agreed, uncovering the most dependable and cost-effective solution to building out the network became priority one.

Through a partnership with SmartWave Technologies in 2016, the city set out to design and deploy a free outdoor Wi-Fi network for East Side students. In addition, the city offered free

Chromebook usage through the library system, with the school district managing registration, providing passcodes and offering support to nearby students and families to access the free Wi-Fi.

Not all access points are created equal

Because a legacy infrastructure was already in place, expanding the existing Wi-Fi network with new access points (APs) required some finesse. The new APs had to prevent spotty coverage, choppy video playback, and slow downloading while avoiding interference with other APs.

Tim Fowell, SmartWave Technologies chief operating officer, understood the challenges that come with extending a network. “When you have too many APs in close proximity,” said Fowell, “it’s possible for more than one AP to carry a device’s signal on the same channel—causing co-channel interference. This is a big factor in degrading a network’s performance.”

This is also why SmartWave Technologies teamed with RUCKUS Networks and selected the T600 and T700 family of APs as their go-to outdoor access points. “RUCKUS outdoor APs feature BeamFlex+,” explained Michael Nesbitt, RUCKUS account manager. “This patented technology mitigates interference by zeroing in on a device using more than 4,000 pre-programmed directional antenna patterns.”

In addition to this adaptive antenna technology, RUCKUS® outdoor APs also offered ChannelFly®, which is designed to maximize throughput. “Locking onto a device’s signal is really only half the battle,” admitted Nesbitt. “The other half is how you manage that signal on that Wi-Fi spectrum. ChannelFly is our dynamic channel technology that uses machine learning to locate and



switch signals to the least congested channels in order to produce the highest throughput the band can support.”

“Deploying the latest generation RUCKUS APs today makes sense,” said Nesbitt. “Because they are more efficient at transmitting signals to any device. By drawing less power from existing devices, they allow students to stay connected longer on the same battery charge.”

Ease of deployment

While performance and future-proofing the network were important factors for choosing RUCKUS, the plug-and-play

aspect of deployment helped make SmartWave’s decision a slam dunk. “The RUCKUS outdoor APs come in a self-contained protective shell,” said Fowell. “So, our installers didn’t need to attach or point antennas. This also made getting permits easier since we were installing these APs on public assets, including streetlights and city-owned buildings.”

“And because RUCKUS APs feature SmartMesh™,” added Fowell, “we didn’t need to run Ethernet cabling between APs in the network.” SmartMesh™ is the RUCKUS Networks wireless meshing



Bridging the gap

Due to the successful deployment in one high school attendance area in 2016, the school and the city expanded the program to seven additional high school attendance areas in the district. All in all, the city of San José and SmartWave deployed more than 900 medium-density APs and almost an equal number of high-density APs throughout the school grounds and surrounding neighborhoods.

Once installed, SmartWave was easily able to manage the network through RUCKUS SmartZone™ network controllers. Meanwhile, ESUHSD is testing the use of RUCKUS AI™ to monitor usage and provide San José City Council and the district with usage reports as well as to manage the service-level agreements (SLAs). Initial implementation of RUCKUS AI—the network analytics, service assurance, and business intelligence software—has shown early signs of success.

ESUHSD's Wi-Fi extension program consisted of:

- 1,800 RUCKUS outdoor Wi-Fi APs
- RUCKUS SmartZone network controller
- RUCKUS AI for SLA management, capacity planning, proactive incident detection and remediation, and service assurance

Today, this project has had a major impact on thousands of students' lives. Low-income students who used to have no viable way to do their schoolwork at home are now able to participate in the digital curriculum through school-provided Chromebooks.

"To date, the end results are significant,"

technology that permits APs to talk to each other over the airwaves—eliminating the need for a wired Ethernet connection.

But what impressed Fowell the most wasn't the ease of installation, but how RUCKUS APs use four multi-user MIMO (MU-MIMO) spatial streams to allow them to deliver performance superior to other APs. "One RUCKUS AP can support up to 4X more concurrent users compared to other legacy APs," said Fowell. "This means we can buy, deploy and manage fewer APs, which in turn creates a cost savings for our customer."

Bringing it all together

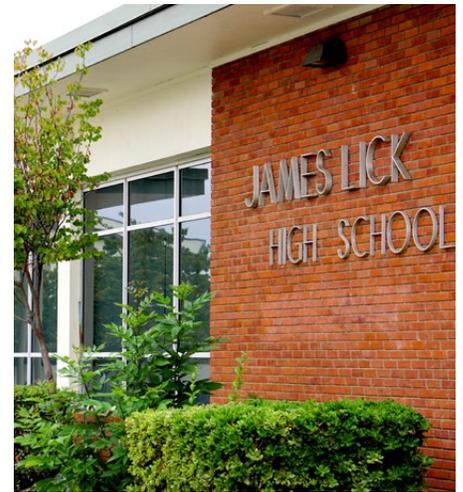
According to Fowell, the high-performance technology inside the APs combined with the installer-friendly deployment exterior was what made RUCKUS outdoor APs the ideal choice for the network. These features included:

- BeamFlex+® adaptive antenna technology, which improves signal quality to connected devices

- ChannelFly dynamic channel technology, which provides the highest signal throughput
- Weather-proofing to IP-67 standards, so no external antenna is needed
- Multi-user MIMO, supporting up to 4X more concurrent users than other APs

Key benefits of RUCKUS implementation:

- Promoting digital equity by granting access to broadband and digital curriculum in students' homes
- Enhancing Wi-Fi performance and reducing interference with RUCKUS outdoor APs featuring adaptive antennas (BeamFlex+) and dynamic channel technology (ChannelFly)
- Cost-efficient solution accommodating more concurrent users, thereby minimizing the number of required APs
- Ensuring widespread internet access to 22,000+ students from underserved neighborhoods for free



said Phelps. “Providing broadband access helps students do better, complete homework—and it is a source of pride to have access to the world in their own neighborhood. It’s a really big deal for our families and our community.”

Post-deployment, based on the usage and client associations, the city discovered that not only the school children but also the broader community was in dire need for connectivity, so they expanded the Wi-Fi network to the broader community as well. Currently the network serves 360,000 households within the community and covers over 12 square miles. When the ESUHSD

recently reported usage to the San José mayor and City Council, they were pleasantly surprised at the terabytes of daily and weekly traffic originating from tens of thousands of end points.

The East Side project is a unique example of what can happen when school districts and cities collaborate to promote digital equity. With a little creativity and teamwork, any city could follow the blueprint laid down by ESUHSD and San José to extend those investments to at-risk students and families. Together, they can build a future where all students can benefit from digital equity and learning at home—giving everyone the tools to reach their full potential.



Essential to the success of East Side Union High School District’s Wi-Fi is the public/private partnership between the city of San José, RUCKUS Networks, and leading wireless integrator SmartWave Technologies. As a four-time Partner of the Year Award Winner with RUCKUS, SmartWave knew how to best deploy the RUCKUS solution for optimum capacity and coverage in a high-density public environment.

About RUCKUS Networks

RUCKUS Networks builds and delivers purpose-driven networks that perform in the demanding environments of the industries we serve. Together with our network of trusted go-to-market partners, we empower our customers to deliver exceptional experiences to the guests, students, residents, citizens and employees who count on them.

www.ruckusnetworks.com

Visit our website or contact your local RUCKUS representative for more information.

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CS-118038-EN (10/23)

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